Can Your Personality Save You From Scrolling? Examining the Moderating Role of Conscientiousness in Screen Time and Procrastination.

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Abstract

Procrastination is a common issue among university students, which has various effects on mental health as well as academic performance. Screen time tendencies, especially in young adults, have increased, due to reasons such as Covid-19 or the increase of technology usage in relation to studying. This research examines the relationship between procrastination and screen time tendencies in students. It is part of a bigger study and employed a quantitative study design comprising a sample of 82 participants. Questionnaires such as the Academic Procrastination Scale (APS), the mini IPIP and self-reported screen time were used to assess the relationship between screen time, conscientiousness and procrastination tendencies, as well as the moderating factor of the personality trait of conscientiousness. Despite some significant results concerning the relationship between conscientiousness and procrastination, results show that there was no significant relationship between screen time and procrastination, as well as no significant moderation effect of conscientiousness. This research adds to the understanding of procrastination as well as screen time, which is an understudied field when it comes to young adults such as students. Discussion points for future research include the lengths of the survey as well as several additional constructs, such as education or gender, which might influence the relationship between screen time and procrastination.

Keywords: procrastination, screen time, conscientiousness, students

Introduction

In the digital age, the construct of screen time has become an increasingly prevalent aspect of daily life. With it comes the importance of examining its potential effects on human life. Screen time itself can be described in a variety of ways, depending on the perspective you want to take. For the sake of this paper, screen time will be defined as any time that is spent engaging with visual or screen-based technologies, including internet use, social media or the use of text messages to communicate (Oswald et al., 2020). Because of the actuality and importance of screen time, there has already been a lot of research on this topic. However, most of it is done about children or adolescents, highlighting positive as well as negative aspects of screen time. For example, it is said that screen time can have moderately positive effects on adolescents, as it provides opportunities to enhance relationships, encourages new connections or aids in academic pursuits (Oswald et al., 2020). Other studies highlight negative associations with screen time, such as poorer physical and mental health, including anxiety, headaches and a decreased quality of life (Trott et al., 2022). As negative effects of screen time in children and adolescents range from physical to cognitive effects, covering language acquisition, academic performance or obesity, screen time guidelines have been invented (Muppalla et al., 2023) These guidelines suggest an adequate amount of screen time for young children and adolescents. For children aged 7 to 12, for example, the recommended amount of screen time is one hour, for adolescents aged 16 or more, it is two hours (Muppalla et al., 2023). However, adequate daily screen time for young adults in general has not yet been established because screen time tendencies and their consequences in adulthood seem to be less investigated than in children or adolescents (Santos et al., 2024). Reasons for that could be that screen time has a range of consequences for children, as they are still developing (Madigan et al., 2019), while the development in adults is already complete. One part of the population that seems to be using screens the most is students. Recent studies found that young adults spend an average of 8.8 hours in front of a screen which, in part can be explained by the Covid-19 pandemic, which led to an increase in screen time (Pandya & Lodha, 2021). But why are these numbers so high? This may be in part because students use their screens, such as laptops or tablets, not only for entertainment purposes but also for studying, which increases their overall screen time (Santos et al., 2024).

One aspect that seems to have a proven impact on screen time tendencies is self-regulation, which is about inhibiting impulses and persisting on tasks, despite boredom or helplessness (Zimmermann & Kitsantas, 2014). Self-regulation is, therefore, an important concept for students, as it helps them to actively participate in the learning process by

inhibiting impulses of distraction and focusing attention on the tasks (Sahranavard et al., 2018). Behavioural and motivational processes are activated through self-regulation, allowing the students to acquire skills and knowledge and reach their individual learning goals (Sahranavard et al., 2018). Several aspects that come into play when someone self-regulates are realistic goal setting, high levels of motivation, or self-monitoring (Cohen, 2012). However, what happens if someone fails to actively self-regulate? One self-regulatory failure is procrastination (Hen & Goroshit., 2020).

There is no single definition for procrastination, as it is a term that is used across a variety of settings with different meanings, such as active or academic procrastination (Klingsieck, 2013). Nonetheless, there is a common underlying understanding of this construct (Klingsieck, 2013). Procrastination is a voluntary delay of an intended action, like studying, even though it has foreseeable negative consequences (Hen & Goroshit, 2020). Generally, procrastination can be maladaptive across varieties of settings. Nevertheless, it seems to be most prevalent among university students, as it affects over 70% of this population (Hen & Goroshit., 2020). This specific form of procrastination is academic procrastination and is especially connected to delaying tasks of an academic nature, such as studying for exams or doing homework (Türel & Dokumaci, 2022). Therefore, it is related to poor academic performance and it is carried out through, for example, sleeping, watching TV or reading (Klingsjeck, 2013). A higher amount of social media usage also plays a role (Muslikah & Andriyani, 2018), and it is suggested that students may spend up to 40% of their time in class not paying attention but being on social media (Alblwi et al., 2021). Engaging in procrastination is associated with task delay, impulsiveness as well as low self-efficacy and can lead to feelings such as self-blame or guilt (Hen & Goroshit, 2020). Because of this, individuals who procrastinate tend to have decreased optimism as well as lower self-esteem and frequently engage in self-handicapping in order to preserve it (Klingsieck, 2013). Considering this, it is not surprising that procrastination is negatively associated with individual well-being and mental health (Klingsieck, 2013). As procrastination is about the delay of tasks and, in a sense, time management, screen time might have an impact on these procrastination tendencies as it is proven to diminish these time management skills (Santos et al., 2024). When internet access increases through the use of various forms of technology, with mobile phones being especially problematic, the tendency for academic procrastination seems to increase as well (Türel & Dokumaci, 2022). However, not all forms of screen time and technology use are problematic and lead to procrastination. Because of this, it is important to differentiate between screen time that is for academic purposes rather than screen

time that is used for other purposes, such as entertainment. Nevertheless, there seems to be a tendency for students who use technology more often to have more procrastination tendencies as well, at least in the academic field (Türel & Dokumaci, 2022). Students, therefore, who spend a lot of time using screens might be more prone to engage in procrastination tendencies.

Given the negative effects of procrastination, it is important to understand individual differences that might lighten the impact. One of these potential factors is the personality trait of conscientiousness. Conscientiousness is one personality trait of the Big Five taxonomy (Roberts et al., 2014). Conscientious individuals can be described as self-controlled, rule-abiding and responsible. Based on these qualities, it is a predictor of high academic achievement in university students. Because of self-control, students high in conscientiousness avoid distractions and tend to control their impulses to do something other than what they are focusing on (Spielmann et al., 2022). This is further supported by high levels of responsibility, which highlight dedication to a task and following through with obligations. Furthermore, conscientious individuals possess more effective time management strategies and can sustain their efforts in a better way (Spielmann et al., 2022). Next to that, conscientiousness also seems to play a role in self-regulatory tendencies as it predicts delay of gratification, which is the measure of one's capability to self-control (Roberts et al., 2014). Generally, researchers differentiate between four and ten facets of conscientiousness, which are said to predict academic achievement even better than the actual Big Five personality traits because they are much more narrow and detailed in the aspects of conscientiousness that they measure (Spielmann et al., 2022). One underlying factor for all of them, and what should be the essence of conscientiousness, is the consideration of the future. Take the facet of industriousness, for example, which is the tendency to aspire to excellence, to work hard and to persist despite challenges. Individuals in whom this facet is strongly pronounced tend to consider the benefits of achieving a goal in the future when deciding whether to take action or not. In this context, high levels of conscientiousness mean choosing strategies that have long-term benefits. Nevertheless, too high levels of conscientiousness can also have negative effects. Those who have these high levels may persist too long on only one task, leading to higher levels of failure or distress. These individuals also tend to respond with tension regarding negative feedback (Spielmann et al., 2022). These facets of conscientiousness, such as self-control, industriousness, good time management and responsibility, counteract the tendencies associated with procrastination. Conscientiousness, therefore, comes into play when it comes to procrastination, as it assumes to lighten the impact it can have on the individual and the level of procrastination itself.

Even though there has been widespread research about procrastination as well as screen time, it is striking that there have not yet been as many studies about the consequences or determinants of screen time in adults, specifically students. The few studies that do exist, show mostly contradicting findings when it comes to that topic (Trott et al., 2022). Some studies suggest a link between screen time and depression, for example, while others do not (Trott et al., 2022). As for the academic context, research suggests that technology might be disruptive to academic achievement and progress, but on the other hand, research indicates that there are only benefits such as enhanced student learning or a greater level of engagement (Rashid & Asghar, 2016). Next to that, the approach that is studied most frequently in this field is the screen addiction approach, which focuses on being addicted to the screen. This approach, however, ignores diverse other environmental or personal determinants (Meier, 2022). Not everyone who spends a lot of time engaging in visual or screen-based technologies is addicted. Let's take higher education or work, for example, where it is sometimes unavoidable to sit in front of a screen (Rashid & Asghar, 2016; Trott et al., 2022). In this context, screens are used to take notes or to access resources (Rashid & Asgahar, 2016), not because someone is addicted. In fact, there could be other moderating factors when it comes to screen time, such as conscientiousness, which might has a positive influence but has not yet been extensively researched in connection with screen time and procrastination. Some additional research is needed in other aspects as well. Some studies suggest a decline in the association between conscientiousness and educational achievement with higher age, highlighting only benefits in primary and secondary education (Spielmann et al., 2022). Reasons for that could be other factors than conscientiousness contributing more to academic achievement in higher education (Spielmann et al., 2022). Knowing this, it would be interesting to know whether the trait of conscientiousness in young adults, such as students who are in tertiary education, even plays a moderating role when it comes to procrastination and screen time tendencies. Therefore, this study investigates screen time, procrastination and conscientiousness among university students aged 18-25, as these are the most common years in which young adults study and research shows that these are also the most common years in which procrastination tendencies occur (He, 2017).

Overall, this research aims to find out, if and to what extent the relationship between screen time tendencies and procrastination in students is moderated by individual differences in the level of the personality trait of conscientiousness (Picture 1). Based on the research gap on this topic, gives rise to my following research question: *'To what extent is there a relationship between screen time and procrastination tendencies in students?'*. I would expect

this relationship to be positive, meaning that higher amounts of screen time lead to higher levels of procrastination. On top of that, the subordinated research question of '*To what extent is there a relationship between procrastination tendencies and conscientiousness in students?*' will be explored. The relationship is expected to be a negative one, meaning higher amounts of conscientiousness lead to lower levels of procrastination. Moreover, as existing research suggests, conscientiousness can play an important factor in counteracting procrastination tendencies. This leads to the following subordinated research question: *'To what extent does the personality trait of conscientiousness moderate the relationship between procrastination and screen time?*. A negative moderation would mean, that conscientiousness reduces the strength of the relationship between procrastination tendencies and screen time. Those questions would mean the following hypotheses:

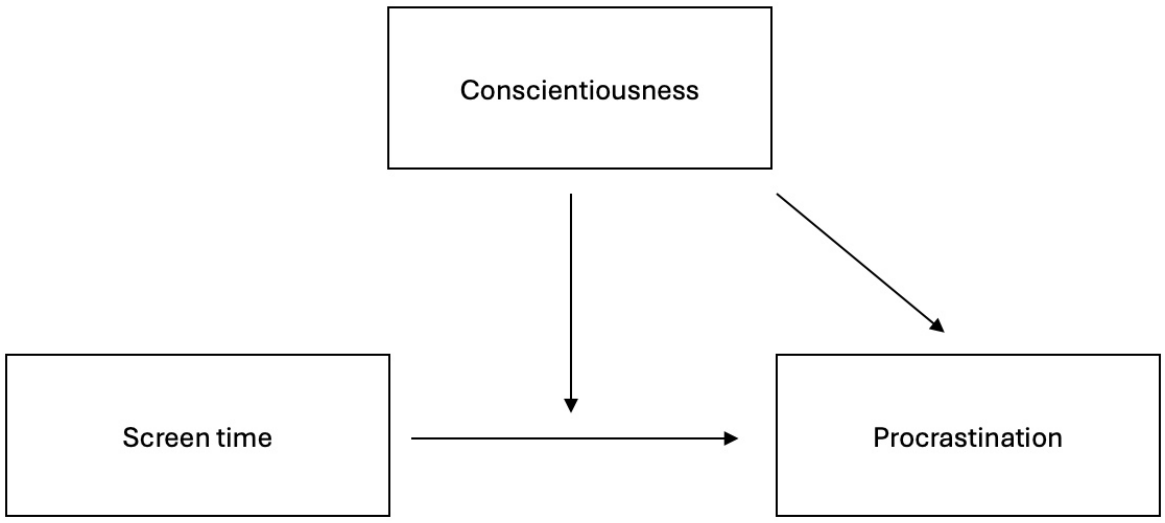
H1: There is a positive relationship between the amount of screen time and procrastination tendencies.

H2: There is a negative relationship between conscientiousness and procrastination.

H3: Conscientiousness moderates the relationship between screen time and procrastination.

Picture 1

Illustration of the relationship between the variables



Methods

Study Design

This research utilises a quantitative study design and uses survey research to collect data. It is part of a bigger study that investigates several constructs of screen time, different aspects of student life and personality traits of the Big Five. This research specifically is

designed to investigate the relationship between screen time and procrastination and how the personality trait of conscientiousness influences this relationship.

Participants

All of the participants were recruited through the SONA website of the University of Twente or other social media platforms (i.e., WhatsApp, Instagram, etc.). Based on this, the sampling method is convenience sampling. In order to take part in the study, participants had to be students between the ages of 18 to 25 and be in tertiary education or higher. This means participants could be at undergraduate, graduate or PhD level.

Materials

For this research, participants needed to have an electronic device, access to Wi-Fi and a link to the survey which was provided through the SONA system or private distribution via text messages. The surveys were conducted using the online platform Qualtrics, where primary data was collected. Following the ethical guidelines, the survey consisted of a total of 135 items; after giving their consent, participants were first asked about their demographics, such as age, gender, nationality and educational level. After that they were asked to fill out the mini international personality item pool (IPIP), which was adapted to this research, self-reported (social media) screen time, parts of the Social Media Activity Questionnaire (SMAQ), the Social Networking Sites (SNS) Questionnaire, the short - Pittsburgh Sleep Quality Inventory (shortPSQI), Perceived Stress Scale (PSS), Academic Procrastination Scale, the Revised Social Connectedness Scale, and the Quality of Life Enjoyment and Satisfaction Questionnaire - Short Form (Q-LES-Q-SF). For this research, only the APS, the self-reported screen time and the mini IPIP will be used (Appendix A).

Academic Procrastination Scale

To measure procrastination, the academic procrastination scale (APS) was used (McCloskey, 2012). The questionnaire consists of 25 items, which are scored on a 5-point Likert scale, with 1 indicating disagreeing and 5 indicating agreeing with the item. Items one, eight, 12, 14 and 25 are reversed scored. The items are of an academic nature and cover questions such as “I put off projects until the last minute.” or “When working on schoolwork, I usually get distracted by other things.”. The scale shows high reliability with an alpha of $\alpha =$ .95. and high internal reliability according to Cronbach’s alpha (McCloskey, 2012).

Screen time

To measure screen time, self-report measures were used (Montagni et al., 2016) that were adapted to this study. Participants were asked to report their daily screen time concerning six domains overall, so their output was per domain. The domains include 1)

screen time in general to determine the amount of total screen time, 2) working on a computer/tablet, 3) playing video games on a computer/tablet, 4) surfing the Internet on a computer/tablet, 5) watching TV or videos (movies, serials, TV programs) on a computer/tablet, and 6) using a smartphone. Answers were indicated on a 10-point Likert scale, ranging from one being "Never" to ten meaning "More than seven hours" (Montagni et al., 2016).

Mini IPIP

For measuring conscientiousness, the mini IPIP scales were used (Donnellan et al., 2006). The scales consist of 20 overall items, with five subscales measuring one of the Big Five personality traits. The subscales for openness and agreeableness will be excluded from the questionnaire to shorten the overall time for filling out the survey, meaning the items go down from 20 to 12. This is done because the personality traits of openness and agreeableness were not researched within the overall study. The remaining items measure conscientiousness, extraversion and neuroticism. For this study, only the questions for the personality trait of conscientiousness will be relevant. The items are scored on a 5-point Likert scale, ranging from 1 being "Very inaccurate" to 5 being "Very accurate". Questions for conscientiousness are, for example, "I get chores done right away." or "I like order." The internal consistency for the conscientiousness subscale is relatively high ($\alpha = .75$) (Donnellan et al., 2006). Two out of the four items for conscientiousness are reverse-scored. However, because of a mistake in the phrasing of one of these items, the item "I often put things back in their proper place." will be scored normally. Originally, this item is phrased as "I often forget to put things back in their proper place". The other item that will be reversed scored is "I make a mess of things.".

Procedure

The first step of data collection was getting approval from the BMS committee. After that, the survey was conducted by reaching students through the SONA platform, personal survey distribution or social media, such as Instagram or WhatsApp. At the beginning of the questionnaire, the participants were asked for consent and informed about the purpose of the study (Appendix B). After giving consent, students were asked to indicate their demographics, meaning to indicate their age, gender, nationality and education. Participants were asked to fill out the survey containing the previously mentioned scales. At the end of the survey, the participants were debriefed about the study and thanked for their participation. The contact details of the researchers were provided for questions or remarks participants had. Participating in the study took the students approximately 15-30 minutes.

Data Analysis

A prior analysis using G*Power 3.1, a statistical software, was conducted to determine the necessary sample size for this research (Faul et al., 2009). For this, a medium effect size (f^2 = 0.15) for multiple regression, a significance level of $\alpha = .05$, and a power effect of 0.8. was set. Based on the output parameters generated by this software, a required sample size of 68 was determined. Starting with the analysis, a descriptive correlational design, including regression analyses, was chosen to investigate the relationship between screen time, procrastination and conscientiousness. Here it was assumed that procrastination is the dependent variable, with screen time and conscientiousness being the independent variables. To inspect the relationship between these variables, data is collected using an online survey. Afterwards, the collected data was analysed using R. Descriptive statistics such as means, percentages and standard deviations were used to investigate and summarise the demographic data of the sample (age, gender, nationality and educational level). Correlation analyses were conducted to investigate the hypothesis that there is a negative relationship between procrastination and conscientiousness. On top of that, these correlation analyses were used to gain more insight into the relationships between the relevant variables and the descriptive statistics. Afterwards, a linear regression model was utilised to describe and investigate the relationship between the dependent variable of procrastination and the independent variable of screen time and to investigate the hypothesis that there is a positive relationship between the amount of screen time and procrastination tendencies. In addition, the regression analysis was conducted to explore the hypothesis that there is a negative relationship between procrastination and conscientiousness. Furthermore, to investigate the hypothesis that conscientiousness is an influencing factor in screen time and procrastination, a moderation analysis was conducted. For all analyses, a significance level of $\alpha < .05$ was set and the assumptions of multiple regression, namely normality, linearity, homoscedasticity and multicollinearity were checked. None of the assumptions were violated.

Results

This part presents the investigation findings on screen time procrastination and conscientiousness. For this, the methods and analyses mentioned earlier will be used to analyse the sample.

Participants

In total, 150 participants filled out the survey, however, 68 of them had to be excluded because they did not finish the questionnaire, leaving 82 participants in the sample, which is believed to be sufficient according to the G*Power. Participants in this sample were students

aged 18-25 years old with an average of 21 (*SD* = 1.73). 71.95% of the sample identify as female (n = 59), with 23.17% identifying as male (n = 19) and 4.88% indicating non-binary/other (n = 4). Regarding their educational level, 81.71% were Bachelor students (n =67), 6.1% were Master students (n = 5), 1.22% were currently doing their PhD (n = 1) and 10.97% were BHO students (n = 9). The nationality of 32.93% of the sample was German (n = 27), 43.9% was Dutch (n = 36) and 23.17% was composed of other nationalities (n = 19).

Descriptive Statistics

A descriptive analysis was conducted to report on the characteristics of the sample regarding their procrastination tendencies, screen time and levels of conscientiousness. Most participants in the sample have a moderately high tendency to procrastinate, as indicated by a mean of 2.96 (*SD* = 0.85). The sample's average screen time in total is 4.53 hours per day (*SD* = 0.88), with working on a computer/tablet and using a smartphone taking up most of the time. The average amount of screen time per day that participants spend working on a computer is 6.06 hours per day (*SD* = 1.93) and the average screen time of smartphone usage is 6.76 hours per day (*SD* = 1.95). Participants in the sample possessed on average a level of 3.35 (*SD* = 0.84) of the trait of conscientiousness. Because of the 5-point Likert scale that was used for assessing this, it can be said that this is also moderately high.

Correlation Analysis

A correlation analysis was conducted to examine the relationships between the variables of procrastination and conscientiousness and the variables of the descriptive statistics, meaning age, gender, nationality and education. The analysis presented several positive as well as negative correlations, however, most of them were non-significant and not very strong. Age was weakly correlated with procrastination, $r(80) = .08$, $p = .47$. In addition, there was a weak correlation was found with screen time, $r(80) = .05$, $p = .68$, as well as conscientiousness, $r(80) = -.1$, $p = .37$. This means that, while age is related to each of the main variables, the association is not very strong. Correlations with gender indicated weak associations as well. The highest correlation was found between gender and procrastination, indicated by $r(80) = -.16$, $p = .14$. The correlations with screen time and conscientiousness were small also, indicated by $r(80) = .05$, $p = .65$. and $r(80) = .11$, $p = .33$, respectively. Nationality seems to be correlated positively with procrastination, $r(80) = .12$, $p = .27$, and screen time $r(80) = .12$, $p = .28$. By conscientiousness, however, the correlation suggests a weak association with gender, $r(80) = .06$, $p = .55$. Lastly, correlation analyses with education presented small results as well. Education and procrastination were weakly correlated, $r(80) = .03$, $p = 76$. Furthermore, a very small correlation with screen time suggests a weak

association with education, $r(80) = .001$, $p = .99$. A significant moderate negative correlation with conscientiousness, however, indicates some association with education $r(80) = -.24$, $p = .03$.

Correlation Analysis Main Variables

To check whether there is a positive relationship between the amount of screen time and procrastination, as well as whether there is a negative relationship between procrastination and conscientiousness, correlation analyses were conducted. A weak negative correlation between the variables of procrastination and screen time was found, $r(80) = -.06$, $p = .57$. This means as procrastination increases, screen time decreases or vice versa. However, the relatively small correlation coefficient suggests a very weak relationship between those two variables. In addition, a significant moderate negative correlation was found between procrastination and conscientiousness, $r(80) = -.53$, $p < .001$. This indicates that higher values in one variable are associated with lower values in the other. Lastly, a weak correlation was found between conscientiousness and screen time, $r(80) = -.02$, $p = .86$, indicating a weak association between those two variables.

Regression Analysis

Next, a multiple regression analysis was conducted, including screentime and conscientiousness as predictors and procrastination as the dependent variable (Table 2).

Table 2

Multiple regression model with procrastination as the dependent variable.

	Estimate	**Std. error**	**T-value**	**P-value**
(Intercept)	5.01	0.57	9.18	<.001
Screentime	-0.07	0.09	-0.79	0.44
Conscientiousness	-0.53	0.09	-5.68	<.001

This regression analysis was used to answer hypotheses one and two. This analysis revealed that screen time does not significantly predict procrastination, $\beta = -.07$, $SE = .09$, $t(79) = -0.79$, $p = .44$. This means that, based on this result, the hypothesis that screen time is positively related to procrastination needs to be rejected. In contrast, the results showed a significant effect of conscientiousness on procrastination, $\beta = -.53$, $SE = .09$, $t(79) = -5.68$, $p < .001$. Based on this, the hypothesis that there is a negative relationship between conscientiousness and procrastination is accepted. This indicates that screen time does not affect procrastination, while high levels of conscientiousness reduce levels of procrastination. An R-squared of 26.4% means that 26.4% of the variance within the dependent variable of procrastination can only be explained by the independent variables of screen time and

conscientiousness. The residual standard error was 0.73, indicating the average amount of error in this model. The analysis revealed a significant F-value of $F(2, 79) = 15.53$, $p < .001$. This indicates that the regression model used in this analysis, which includes screen time and conscientiousness as predictors, is statistically significant. This means, that the model can explain the collective effect of the predictors on the dependent variable of procrastination.

Moderation Analysis

Lastly, a moderation analysis was conducted in order to test the prediction that conscientiousness moderates the relationship between procrastination and screen time. Although a negative coefficient was found, the analysis revealed no significant interaction effect of conscientiousness, $\beta = -.2$, $SE = .11$, $t = -1.84$, $p = .07$. This indicates that there is no moderation effect of conscientiousness on the relationship between procrastination and screen time. Furthermore, the F-value of $F(3, 78) = 11.79$, $p < .001$ suggests that the model was statistically significant and suitable for explaining the effect of conscientiousness on the relationship between procrastination and screen time. Based on these results, the hypothesis that conscientiousness reduces the relationship between screen time and procrastination needs to be rejected.

Discussion

This research aimed to examine the effect of screen time and conscientiousness on procrastination and to investigate whether the personality trait of conscientiousness moderates this relationship. Based on previous research, the hypothesis was made that there is a positive relationship between screen time and procrastination tendencies. This hypothesis will be answered based on the multiple regression analysis. The findings revealed that there were no significant effects of screen time on procrastination, meaning procrastination does not seem to be affected by screen time tendencies. The second hypothesis, that there is a negative relationship between conscientiousness and procrastination, was answered using correlation and multiple regression analyses. Based on significant findings, this hypothesis can be accepted. A third hypothesis was formulated which indicated that conscientiousness moderates the relationship between screen time and procrastination. A moderation analysis was used to answer this hypothesis and the result displayed no significant moderation effect. Based on this, conscientiousness does not reduce the strength of the relationship between screen time and procrastination.

Given the literature, it was not expected to find no relationship between screen time and procrastination. As suggested by Türel & Dokumaci (2022) higher screen time should

lead to higher tendencies to procrastinate, especially when it comes to academic procrastination. In this research, however, this does not seem to be the case. Contrary, a negative correlation was found between those two variables, meaning that higher amounts of screen time seem to decrease procrastination tendencies. There are several explanations for this. First of all, as indicated by Santos et al. (2024), students might have higher screen times because they are actively using their screens for academic purposes. This would underline the importance of differentiating between the purpose for which screen time is used (Türel & Dokumaci, 2022). This research supports this because many participants stated that they spend most of their time on their computer working or studying, rather than using it for entertainment purposes. Another explanation could be that the participants of the sample do not procrastinate using technology, since technology is not the only way to procrastinate. Other forms of procrastination are, for example, eating, sleeping or talking to/doing activities with friends or family (Pychyl et al., 2000).

As for the analysis of the personality trait of conscientiousness and the variable of procrastination, a significant negative correlation as well as regression was found. This means that higher levels of conscientiousness are associated with lower procrastination tendencies. Given the fact that conscientious individuals are self-controlled and responsible (Spielmann et al., 2022), this relationship was expected. Conscientiousness is indicative of academic success as it ensures good time management as well as impulse control (Spielmann et al., 2022). On top of that, decreased conscientiousness is in connection with increased procrastination tendencies (Klingsieck, 2013). This means that the less conscientious someone is, the more likely the person is to procrastinate.

The overall moderation analysis with conscientiousness as the moderating factor did reveal non-significant results. Based on this, it can be said that conscientiousness, even though affecting procrastination, does not reduce the strengths of the relationship between screen time and procrastination. An explanation for this is that the type of screen time investigated in this research, might not be informative when it comes to conscientiousness. Individuals within the sample indicated using their screens increasingly in favour of study or work-related aspects. As already mentioned, individuals high in conscientiousness are goal-oriented and self-controlled (Spielmann et al., 2022). It can be expected that conscientious individuals are more likely to utilise screens for productive purposes like studying or working, potentially leading to increased overall screen time (Beierle et al., 2020). Because of this, conscientiousness may not moderate the relationship between screen time and procrastination as it is an active predictor of higher screen times in this research.

Limitations

To account for these (non-)significant results, some limitations need to be mentioned. The first thing that is important to note is the length of the questionnaire. The questionnaire consisted of 135 items measuring several different constructs, which took participants approximately 15 to 30 minutes. Comparing this amount of items to other, similar, studies that were used to ground this research on, this is quite a lot. In the majority of cases, the questionnaires contain about 50 items (Zimmerman & Kitsantas, 2014; Sahranavard et al., 2018). The questionnaire used for this research might have been too time-consuming or led to a lack of engagement in some students, which is why they did not finish the questionnaire. On top of that, because of the length, participants might not have thought thoroughly about their answers but rushed through them to finish the questionnaire more quickly. This is underlined by the findings of Burchell & Marsh (1992), which highlight that questionnaires comprising more than 100 items can lead to negative effects on response quality on the side of the participants, especially at the end of the survey. These lower-quality responses emerge because of boredom and fatigue, which leads to reduced willingness to make an effort when answering the questions (Galesic & Bosnjak, 2009). Based on this, using a shorter questionnaire in future research is advisable to ensure engagement and completion of the questionnaire. One way to do this, for example, is to conduct research alone, or with fewer collaborators, assuring that only questionnaires will be included that are relevant to the research. Of course, the accuracy of the data could have also been reduced because of the mistake in the phrasing of one of the questions for conscientiousness, which led to it being scored normally rather than reversed. The outcome of this specific questionnaire might have been different if the item had been phrased correctly. Changing the wording of an item within a questionnaire might lead to different construct validity, meaning the item does not measure what it is intended to measure, which is conscientiousness in this case (O'Leary-Kelly & Vorkurka, 1998). Therefore, it is advisable to place more caution when it comes to the construction of the survey to avoid these mistakes in the future. Lastly, as the questionnaire relies on self-report data, social desirability bias might come into play and reduce the accuracy of the data (Chung & Monroe, 2003). Participants want to display themselves in a favourable way or good manner, where they report answers that are not truthful but in line with socially acceptable values. This can affect the self-reported data and, therefore, reduce its validity (Chung & Monroe, 2003).

Recommendations

Knowing these limitations already provides good starting points for improving future research, but it may also be worth building upon this research by including other factors. This research already touched on some of these topics using the correlation analysis within the descriptive statistics, which covered additional variables such as education, age, gender or nationality. However, most of these correlations turned out to be non-significant. Therefore, diving deeper into these variables and how they could influence procrastination tendencies might be interesting. The first interesting point to build further on is the factor of education, which is the only variable leading to significant correlations with conscientiousness. There seems to be a tendency for people with higher education, meaning having a high school diploma, to procrastinate less than people who do not have one (Steel & Ferrari, 2013). On top of that, it is suggested that there are even differences in tertiary education, with graduates procrastinating less than undergraduates (Özer, 2011). Reasons for that could be maturity and more experience in school (Cao, 2012). Education, therefore, might influence procrastination tendencies as well as conscientiousness and screen time. Including education, such as the type of education or previous educational paths, could bring about an interesting contribution to this field. Putting more research into different genders might also be compelling. It is well-documented that men tend to procrastinate more than women do (Steel & Ferrari, 2013). This is due to lower levels of self-control and, consequently, higher levels of impulsiveness in men (Steel & Ferrari, 2013), which are predictors for procrastination (Klingsieck, 2013). There could be differences between males and females not only in procrastination tendencies but also in levels of screen time and conscientiousness that might influence the relationship between those two variables. An aspect that correlates with education as well as with procrastination is age. It is indicated that age plays a factor in procrastination as well, with procrastination being less prevalent at higher ages (Steel & Ferrari, 2013). This is because, with age, people become more conscientious and mature (Spielmann et al., 2022) and, therefore, more responsible, which is a factor counteracting procrastination (Klingsieck, 2013). As for nationality, there does not seem to be a relationship suggesting that procrastination is affected by different nationalities (Steel & Ferrari, 2013).

Recommendation Social Media

Another point interesting for future research is the aspect of social media. A study by Muslikah & Andriyani (2018) revealed that there is a relationship between procrastination and social media in university students. Students, who indicated higher procrastination tendencies showed higher social media usage as well. This is because procrastinators look for something more pleasurable than doing academic work for their studies, and social media meets the

criteria (Muslikah & Andriyani, 2018). Because undergraduate students tend to spend a lot of their time on social media (Türel & Dokumaci, 2022), this will increase their overall screen time as well. Since social media seems to have a big impact on procrastination and screen time, it may be worth further investigating how it could mediate this relationship. Within this mediation, screen time could lead to higher social media use, which may affect procrastination tendencies (MacKinnon et al., 2007). Diving deeper into the types of screen time could also be interesting. Some types of screen time might mediate or influence procrastination tendencies in different ways. For example, technologies such as smartphones might be more influential on procrastination because of the tendency to use them for social media, even during class (Türel & Dokumaci, 2022).

Contribution

Despite its limitations, this research provides a meaningful contribution to the academic field. As already pointed out, there is a gap in the research about screen time when it comes to young adults. Especially when it comes to studies that focus on all three of the variables, procrastination, screen time and conscientiousness, the findings are either contradicting or non-existent. Even though regression analysis and moderation analyses were non-significant, some factors tie procrastination, conscientiousness and screen time together. Understanding factors that influence procrastination can lay the ground for promoting academic achievement and reducing procrastination tendencies by being focused and teaching coping mechanisms. On top of that, this study underlines that not all screen time is bad. Within the right context and with the right amount of conscientiousness, screen time can lead to better academic achievement.

Conclusion

In conclusion, this research explored the effect screen time has on the procrastination tendencies of students. The findings of the study, despite mixed, provide valuable insights into the relationship between screen time and procrastination, also under the influence of the factor of conscientiousness. While regression analyses between screen time and procrastination yielded non-significant results, some significant correlations were found between procrastination and conscientiousness. Building upon this research, by changing small details or by implementing other factors such as education or gender, can be beneficial. Finding the sources of procrastination can help prevent procrastination by introducing interventions where they are needed. Gaining further insights into the theme of procrastination can help tackle the problem that is very relevant for many students.

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AI Statement

The research in this thesis has been conducted by the author without the use of artificial intelligence tools. Software that has been used to write this thesis includes but is not limited to, Mircosoft Word, R Studio, G*Power 3.1 and Google Scholar.

24.06.2024

Matea Steven

Appendices

Appendix A: Questionnaires

Academic Procrastination Scale (APS)

These questions are about your procrastination tendencies, meaning how quickly you get things done or whether you tend to put them off. Please indicate your answer to the questions on a scale of Disagree to Agree.

1. I usually allocate time to review and proofread my work.*
2. I put off projects until the last minute.
3. I have found myself waiting until the day before to start a big project.
4. I know I should work on schoolwork, but I just don't do it.
5. When working on schoolwork, I usually get distracted by other things.
6. I waste a lot of time on unimportant things.
7. I get distracted by other, more fun, things when I am supposed to work on schoolwork.
8. I concentrate on schoolwork instead of other distractions.*
9. I can't focus on schoolwork or projects for more than an hour until I get distracted.
10. My attention span for schoolwork is very short.
11. Tests are meant to be studied for just the night before.
12. I feel prepared well in advance for most tests.*
13. "Cramming" and last minute studying is the best way that I study for a big test.
14. I allocate time so I don't have to "cram" at the end of the semester.*
15. I only study the night before exams.
16. If an assignment is due at midnight, I will work on it until 23:59.
17. When given an assignment, I usually put it away and forget about it until it is almost due.
18. Friends usually distract me from schoolwork.
19. I find myself talking to friends or family instead of working on schoolwork.
20. On the weekends, I make plans to do homework and projects, but I get distracted and hang out with friends.
21. I tend to put off things for the next day.
22. I don't spend much time studying school material until the end of the semester.
23. I frequently find myself putting important deadlines off.
24. If I don't understand something, I'll usually wait until the night before the test to figure it out.

25. I read the textbook and look over notes before coming to class and listening to a lecture or teacher. *

* Indicates reverse-scored items.

Self-reported Screen Time

For the next questions, please indicate the average time you spend in a day in front of these different screens. If you can, indicate the accurate measure by using the "screen time" option in the settings of the device. If not, try to estimate the time as good as possible. What is the average time in a day spent...

	Never	30 min or less	0.5 - 1 h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	6 - 7 h	More than 7h
...working on a computer/tablet.	○	○	○	○	○	○	○	○	○	○
...playing video games on a computer/tablet.	○	○	○	○	○	○	○	○	○	○
...surfing the internet on a computer/tablet.	○	○	○	○	○	○	○	○	○	○

	Never	30 min or less	0.5 - 1 h	1 - 2 h	2 - 3 h	3 - 4 h	4 - 5 h	5 - 6 h	6 - 7 h	More than 7h
...watching TV or videos (movies, series, TV programs) on a computer/tablet.	○	○	○	○	○	○	○	○	○	○
...using a smartphone.	○	○	○	○	○	○	○	○	○	○

What is your estimated daily screen time across all devices in hours?

Mini IPIP

Please indicate on a range of very inaccurate to very accurate how much the statements suit you as a person.

Personality Trait	Item
E	I am the life of the party.
C	I get chores done right away.
N	I have frequent mood swings.
E	I don't talk a lot. (R)
C	I often put things back in their proper place.
N	I am relaxed most of the time. (R)
E	I talk to a lot of different people at parties.
C	I like order.
N	I get upset easily.
E	I keep in the background. (R)
C	I make a mess of things. (R)
N	I seldom feel blue.

Appendix B

Informed Consent

Thank you for participating in our study centered around screen time, personality, and aspects of student life. Participation in this study is completely voluntary, and it is possible to withdraw from this study at any point without giving an explanation. While participating in this study you will be asked several questions that are related to (Social Media) Screen Time, Personality, Sleep Quality, Procrastination, Life Satisfaction, Perceived Stress.

There are no known safety risks related to participation. The estimated time to complete this questionnaire is 15-30 minutes. If you are a student participating through the SONA-system, completing this study will reward you with 0.25 SONA-point(s).

The data that is collected will be anonymised and will only be available to the researchers. Since the data is anonymised, even the researchers will not be able to identify you from your personal information. So please answer all questions as honestly as possible. Once the research is concluded, the data will be disposed in accordance with the guidelines of the University of Twente. If there are any questions or remarks, please feel free to contact the researchers:

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